

WHAT IS CLAIMED IS:

1. A gas flow simulation method comprising the steps of:  
forming an object having at least one concavity on a surface  
thereof by means of a computer and extracting a part of said surface  
5 of said object including said concavity;

forming a spatial part from a space located on the periphery  
of said object by dividing a portion of said spatial part in contact  
with said extracted surface of said object into blocks;

forming a large number of lattice-shaped portions by  
10 dividing said spatial part into lattices;

flowing a gas into said spatial part in one direction along  
said surface of said object and discharging said gas in a different  
direction through an inside of said spatial part;

computing a motion element of a flow of said gas for each  
5 lattice-shaped portion of said spatial part; and

simulating a flow of said gas on the periphery of said  
concavity.

2. The gas flow simulation method according to claim 1,  
wherein said motion element of said gas flow is a velocity of said  
20 gas flow, a direction of said gas flow, and a pressure of said  
gas flow applied to said surface of said object in each axial  
direction of a three-dimensional space coordinate system, and

said motion element is computed at each slight time  $dt$  by  
using the equation of continuity and the Navier-Stokes equation.

25 3. The gas flow simulation method according to claim 1,

wherein based on a result of said computation, a gas flow on the periphery of said concavity is simulated by visualizing a flow direction of said gas flow and a flow velocity thereof by a vector direction and a vector length respectively.

5           4.     The gas flow simulation method according to claim 1, wherein based on a result of said computation, a gas flow on the periphery of said concavity is simulated by visualizing a pressure distribution of said gas flow by an isobaric line or a surface connecting equal pressures to each other.

10           5.     The gas flow simulation method according to claim 1, wherein based on a result of said computation, a gas flow on the periphery of said concavity is simulated by visualizing a vorticity distribution of said gas flow by an isopleth of equal vorticities or a surface connecting equal vorticities to each other.

15           6.     The gas flow simulation method according to claim 1, wherein based on a result of said computation, a gas flow on the periphery of said concavity is simulated by visualizing a stream line, a trajectory, and a particle trace of said gas flow.

20           7.     The gas flow simulation method according to claim 1, wherein a height of said spatial part with respect to said surface of said object is set to more than 10 times as large as a depth of said concavity nor more than 10000 times as large as said depth thereof.

25           8.     The gas flow simulation method according to claim 1,

wherein a height of each of said lattice-shaped portions of said spatial part located in a range less than  $1/Re^{0.5}$  (Re is Reynolds number,  $Re = \text{representative velocity} \times \text{representative length/kinematic viscosity of gas}$ ) with respect to said surface of said object is set to not less than  $1/(1000 \cdot Re^{0.5})$  nor more than  $1/Re^{0.5}$ , and said height of each of said lattice-shaped portions located in a range not less than  $1/Re^{0.5}$  with respect to said surface of said object is set to not less than  $1/Re^{0.5}$ .

9. The gas flow simulation method according to claim 1, wherein said surface of said object is curved, and a flow direction of said gas which flows into said spatial part and discharged therefrom is corrected in conformity to a curvature of said surface of said object.

10. The gas flow simulation method according to claim 1, wherein said object is a golf ball, said concavity is a dimple, and a flow of a gas on the periphery of said dimple of said golf ball is simulated.